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# Science News-Letter

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February 18, 1928

PALEOBOTANY

## How the Redwoods Marched Around the Pacific

By FRANK THONE

Trees march.

Deeply though their roots are anchored, far down into the soil and through crevices in the solid rock, forests move like armies.

Not mere little afternoon jaunts, either, like the famous hike that Shakespeare wrote about, when Birnam Wood came to Dunsinane Hill. They cross whole continents, and if an ocean gets in their way they simply go around it.

A new chapter in the history of forest migrations has recently been written by Dr. Ralph W. Chaney, research associate of the Carnegie Institution of Washington. In the same parts of Asia where the expeditions of the American Museum of Natural History found their famed dinosaur eggs, he has found the stone-writ record of the trees and bushes through which these mighty beasts once went crashing. And strange to say, though the dinosaurs have long since vanished, and whole generations of other monsters have come and gone since them, the forests that grow in northern California today are so much like those Manchurian forests of millions of years ago that only an expert professional botanist could tell them apart.

It was in the cold, arid, inland region of the Gobi in Mongolia that the drama of the dinosaurs centered. The high point in the studious adventures of Dr. Chaney was reached in the kinder climate of Manchuria, to the east of Mongolia, and separated from the latter province by a high range of mountains, the Khingan. Here, associated with the great Manchurian coal deposits, some of which are already being mined, he found the fossil tracks of the march of the redwood forest.

The record was plain and easy to read. It was, indeed, in the form of a great stone book, with layers



A PAGE FROM THE ANABASIS OF THE REDWOODS, more ancient than the Age of Ice. The darker patches are fragments of fossil alder leaves

of shale for the pages, imprinted with the fossils themselves as the words. A veritable picture-writing, and a thousand times clearer, at that, than the man-made hieroglyphics of Egypt or early China.

"Here were the redwoods!" That was the record written largest on page after page, through stone volumes representing hundreds of millennia. "Here also were alder, oak, maple, ferns," the record continued. But these latter species were not written in so often. There were fewer of their fossil leaves and stems and fruits pressed out between the pages of shale. The inference was easy enough. The more there were of a given kind of fossil, the greater must have been the orig-

inal mass of vegetation that bore that kind of leaf. Therefore we had here in Manchuria, two million years ago, a forest consisting predominantly of redwood trees, with maples and alders among their huge trunks, and oaks fringing the forest. The ground, at least along the stream courses and perhaps elsewhere also, was carpeted with ferns. If you go into the forest in the famous "redwood belt" of the coast of northern California you will find exactly such a picture. And you will find it nowhere else on earth!

There are other writings on the multiplex pages of the ancient stone books which Dr. Chaney has read—corollary notes to his chapter on

(Just turn the page)

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## The March of the Redwoods

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the march of the redwoods. For instance, there is a living species of hawthorn in northern China and Japan that has leaves like those of a long-extinct fossil species found in Oregon, and there is no living American hawthorn that shows a like relationship. One of the common elms now growing in northern China is much like a fossil elm from eastern Oregon which has no near relative, either living or fossil, in America.

But to return to our redwoods. What was their line of march? Did they originate in the Old World and cross over to the New by way of the Bering Straits region, as the human race is assumed to have done? Or did they evolve first in America and "go west" until they reached Asia? A final answer can not be reached on the basis of the data at present in hand, and Dr. Chaney very wisely refrains from offering one. If we look at a map showing the places where redwood fossils have been found, we see most of the spots on the North American continent. But that may mean nothing more than that North America has been more thoroughly combed over for fossils than the vast empty spaces of interior Asia. More Asiatic expeditions and more intensive work in other fields are needed before a conclusion can be reached in this absorbing problem.

There is a hint, on the distribution map of the finds of redwood fossils, of a possible third alternative. You will see these finds spotted in away up in the Arctic: in Spitzbergen, on the west coast of Greenland, out on the waste tundras of northern Canada, and one find far up among those desolate islands north of Baffin Land where Peary used to go when he turned his face toward the then unconquered Pole. Geologists have good evidence that these icy lands once had temperate climates, with at

times even subtropic conditions. May it not be that the nursery of the redwoods was in a lost polar paradise, now buried under the groaning glaciers of Greenland, or perhaps even sunk beneath the Arctic sea?

But that question, fascinating as it is, must remain unanswered for the present.

Dr. Chaney has found other things written in his ancient books of stone, in these same picture-words made by falling leaves and twigs. The record gives to him who can read some idea of the climate enjoyed by the Manchuria of two million years ago. The redwoods whose fossils he has found there were like the California coast redwoods, rather than the "big trees" of the more inland mountains. The present California coastal forest enjoys an equable climate, virtually without freezing temperatures, a rather humid atmosphere, and a rainfall of from forty to fifty inches, distributed fairly evenly throughout the year. This is a much milder climate than Manchuria has had during historic times, and probably than it has had since the Pleistocene, or glacial period. Manchuria's climate resembles that of our own Middle West; cold winters, rather hot summers, a rainfall considerably less than that of the present redwood belt of California, and not so evenly distributed. The country supports a rich growth of oaks, elms, maples and other trees, but nothing resembling the redwood forests.

It is not necessary to infer, however, that in the milder-climate days when the redwoods grew there the weather was exactly like that of modern northern California. Dr. Chaney points out that redwoods grow in the northern United States when transplanted, and that these ancient trees might have been willing to get along with a somewhat less humid climate. But there can be little doubt

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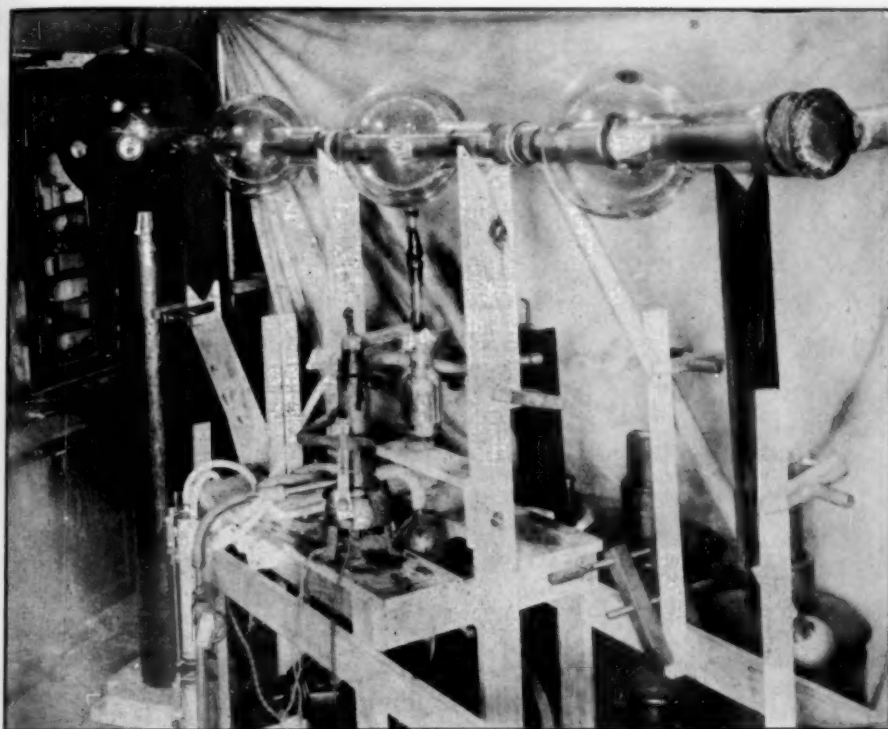
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# 900,000 Volt Tube Heralds Artificial Radium Rays



THE 900,000 VOLT CATHODE RAY TUBE constructed by Dr. Coolidge, the first to use the new principle of "cascading." A powerful stream of cathode rays emerges from the nickel "window" at the right hand edge of the row of tubes

By JAMES STOKLEY

Artificial rays of radium, in quantities that could only be obtained from a ton of this valuable element, worth 56 billion dollars at present prices, will soon be produced in the laboratory, declared Dr. William D. Coolidge, General Electric physicist and inventor of the X-ray tube now in general use, a few days ago. He revealed for the first time details of a new form of his cathode ray tube, and which, by a method of cascading, he has already operated at 900,000 volts, three times as great a power as previously achieved.

Radium gives off three kinds of rays: alpha rays, or rapidly moving atoms of helium; beta rays, or speeding electrons—the "atoms" of electricity; and gamma rays, similar to x-rays. It has not been possible successfully to imitate radium radiation exactly because sufficient electrical power could not be put into the generating apparatus.

Dr. Coolidge's latest invention will make it possible to increase the voltages applicable to x-ray tubes generating gamma rays, and it will also enhance the power of the cathode ray tubes and speed up the electrons which correspond to beta rays.

In fact, it may be possible in time to surpass the power of radium and provide a new tool for the scientist who now uses radium medically and industrially with telling effect.

Speaking before the American Institute of Electrical Engineers, which conferred upon him the Edison medal, Dr. Coolidge indicated what the apparatus can do:

"This opens a vista of alluring scientific possibilities. It has tantalized us for years to think that we couldn't produce in the laboratory just as high speed electrons as the highest velocity beta rays of radium and just as penetrating radiations as the shortest wave-length gamma rays from radium. According to Sir Ernest Rutherford, we need only a little more than twice the voltage which we have already employed, to produce x-rays as penetrating as the most penetrating gamma rays from radium and three million volts to produce as high speed beta-ray."

The intensity factor would be tremendously in our favor, as with twelve milliamperes of current we would have as many high speed electrons coming from the tube as from a ton of radium. Another factor in our favor would be the control which we would have of the output.

This would be quite different from our position with respect to radium, in which case no physical or chemical agency at our command in any way affects either the quality or the quantity of the output.

"What shall we do with the high speed particles obtainable from tubes operating at a potential difference of millions of volts? The lure, of course, lies in the fact that we can't answer the question, beyond saying that we shall experiment with them. They should eventually help us to further knowledge of the atomic nucleus and to further knowledge of radiation laws. It is furthermore not unlikely that therapeutic, chemical bactericidal or other practical uses will develop."

Dr. Coolidge's original cathode ray tube is an evacuated bulb, with two long extensions. Through one end comes the cathode, which consists of a small electric lamp filament of tungsten. Such a filament, when lighted, gives off electrons which move very slowly. Through the other projection from the bulb extends a long copper tube, the anode. When the filament is lighted, a copious stream of electrons is emitted. Then a high voltage, say 250,000 is applied to the tube. This powerful current speeds up the electrons so that they travel through the copper tube, and out to the open air through a thin nickel "window." A "cold cathode effect" prevents the use of more than about 250,000 volts in one tube.

The method now used by Dr. Coolidge to speed up the electrons still more is the very ingenious one of placing several tubes in tandem. The electrons, or cathode rays, in the first tube are furnished by the glowing filament. The end of the first tube takes the place of the cathode of the next, and the electrons from the first tube, already rapidly moving, are still further speeded up by the application of 250,000 volts in the second tube. The speeding stream is fed into a third tube, from which the rays emerge with a speed equivalent to that of the total voltage of the three tubes. With three tubes, Dr. Coolidge has obtained the effect of 900,000 volts, and much more can be used without serious difficulty.

### Do You Know That—

Fresh milk is seven-eighths water.

Benjamin Franklin invented a peculiar musical instrument.

Coffee was introduced into England in the seventeenth century.

A meter to measure the force of a swimmer's stroke has been devised.

Mosquito nets were used by the ancient Romans.

The large-mouth black bass is a fish cannibal.

The oxygen in water causes iron and steel to rust.

Tiny humming birds can fly over 500 miles in a single night.

During one year 260 persons in Chicago were saved by the pulmotor.

There were almost no lakes in North America before the glacial period.

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## INVENTIONS

## ETHNOLOGY

## ARCHÆOLOGY

## Explores with Wheeled Boat

A 16-foot boat with a Ford chassis and engine mounted inside, and with Ford axles and wheels with balloon tires outside is the strange vehicle developed by Dr. T. A. Jaggar, of the Hawaiian Volcano Observatory, for use in volcano explorations.

According to Dr. Jaggar, he has wanted a wheeled boat of some kind, that would beach itself, since 1907 when he was exploring in the Aleutian Islands. He was then on a schooner, near a large volcano which he wanted to investigate, but was unable to get ashore as there was no anchorage, and had to put to sea again. Last year he tried a special low-g geared small automobile, and while it proved satisfactory for running along the beach, the harbors, inlets and rocky stretches proved obstacles.

The new boat on wheels overcomes these difficulties, as it can be driven along the beach on its wheels, and then, when it is desired to go in the water it simply drives down to the edge and in. Then a pair of steel paddle wheels, about two feet in diameter, is attached. These are about one-third submerged and drive the boat along in the water. The rear wheels continue to revolve while in the water, though they are largely submerged. The disc front wheels act as rudders to steer the boat with the same steering wheel that is used on land.

Dr. Jaggar plans to use the boat exploring along the Kona coast of Hawaii, near where the lava flow of the recent Mauna Loa eruptions entered the sea. Previous flows have entered the sea in this region, and Dr. Jaggar hopes, by cooperating with the Coast and Geodetic Survey, to locate these definitely.

Science News-Letter, February 18, 1928

## ZOOLOGY

## The Tortoise Retorts

I note, dear Punch, with pained surprise

You say we war on slugs and flies,  
And, having libelled us with pen,  
With pencil rub it in again.

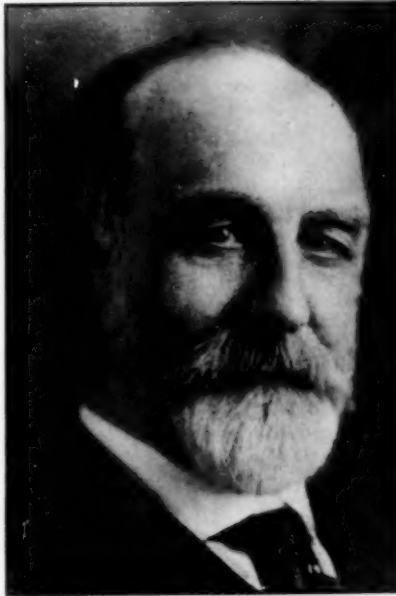
Omniscient Sage, for once you're wrong.

Land tortoises do not belong  
To any flesh-consuming orders:  
We are in fact herbaceous boarders.

—From *Punch*.

Science News-Letter, February 18, 1928

Chocolate drunk by the Mexicans  
is sometimes flavored with red pepper.



JESSE WALTER FEWKES

## Honorary Hopi

An honorary member of the Antelope clan of the Hopi Indians, into which he was initiated with the native ceremonies, a knight of a Spanish order, a member of the National Academy of Sciences of the United States as well as many foreign scientific bodies—these are but a few of the honors that have come to Dr. Fewkes in his long and active scientific life. Though now, in his 78th year, he is retiring from the headship of the Smithsonian Institution's Bureau of American Ethnology, it is not with any idea of writing *finis* to his labors. Instead, it is to give him more time from administrative duties for his own researches, so for many years to come, the scientific world hopes and expects to have the benefit of his work.

Regarded as the highest living authority on the lives, customs and tribal rites of the American Indian, he has passed much time among the Hopis, and has written a number of bulletins about them, especially studying their celebrated snake dances. He was one of the first scientist visitors to the pueblos of the Hopi to call attention to that weirdly mysterious dance, and descriptions of this have been published by him under the imprimatur of the National Museum and the Smithsonian Institution. So highly did the Hopis esteem him that he was initiated into one of the two fraternities of the tribe, the Antelope Clan.

(Just turn the page)

## Queen's Tomb Found at Ur

The burial chamber of a queen of Ur of the Chaldees, containing the body of the queen decked in her royal robes, is the latest discovery reported from the Joint Expedition of the Museum of the University of Pennsylvania and the British Museum.

The queen, who ruled in the home town of Abraham some 5,000 years ago, was found lying on a wooden bier, according to a report just received from C. Leonard Woolley, director of the expedition. Her servants who attended her in life were still with her in death, crouched at the head and foot of the queen's person.

A cloak entirely covered with rows of bright beadwork of gold and lapis, cornelian and agate, wrapped the queen's body. And on a seal which clasped the cloak was the name of the queen, Shub-ad. The headdress and crown of the queen is of particular interest, the report shows. Originally she had worn a great wig, and over this was coil after coil of gold ribbon drapping the hair. The coronet was decorated with lapis and cornelian and heavy rings of gold, and above the gems were wreaths of gold leaves with large gold flowers inlaid with lapis and white shell. A choker necklace of lapis and gold and garters of lapis and gold about the knees completed the queen's costume.

The queen's burial chamber with many articles of gold and silver has rested undisturbed through the centuries, but the adjoining tomb of her husband, which the expedition had previously opened, was broken into and plundered long ago.

From the evidence, the archaeologists have concluded that the very persons who buried the queen made her interment the occasion for the sacrilege of her husband's grave, Mr. Woolley states.

The king apparently died first and was buried. Later, when the queen was to be placed near him, the workers who dug the new tomb could not resist the temptation to break through the vault of the king's chamber to where the richest treasures were to be had for the taking. They hid their theft by placing a great clothes chest over the hole.

"The two tombs contribute information of the greatest importance for the history of architecture," Mr. Woolley declares, "in that both

(Just turn the page)



### Queen's Tomb at Ur

(Continued from page 101)

tombs had doorways crowned by a true arch of baked bricks and their chambers were vaulted with arches, of which a few rings still remain. Heretofore, the oldest arch known in the world dated back to the third millenium B. C. and was discovered in Nippur. Excavation of the tombs in Ur now reveals that corbel vaulting, the true arch and the dome were all familiar to the Sumerian builder and were carried out both in brick and stone in the fourth millenium B. C."

Science News-Letter, February 18, 1928

The Indians of the New World had already domesticated the guinea pig, llama, turkey, and alpaca by the time Columbus arrived.

Wireless engineers say that doves have difficulty in finding their way home where there are a number of broadcasting stations.

In order to keep track of the seal population on the Pribilof Islands, 10,000 one year old male seals are to be sheared this year.

An Australian company has imported 15 tons of typical tobacco soil from North Carolina in which to grow tobacco for a series of tests.

Establishment of a division of history in the National Academy of Sciences is advocated by Dr. Michael Pupin, of Columbia University.

False fire alarms are so frequent in Berlin that an inventor has devised an automatic way of recording fingerprints of a person turning in an alarm.

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### Honorary Hopi

(Continued from page 101)

Blood fellowship in this allowed him to descend into the *kivas* and underground caverns where the rites and ceremonies of the two clans are practiced, and to which only members are admitted. This enabled him to gain first hand knowledge vouchsafed to no other scientist.

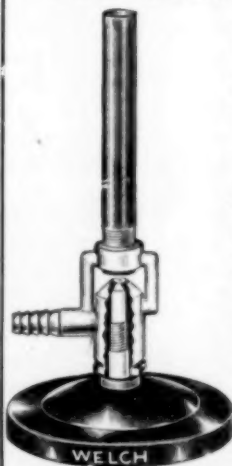
Dr. Fewkes was born in Newton, Mass., in 1850. He took his A. B. degree at Harvard in 1875, and his Ph. D. and A. M. in 1877. In 1878-80 he was a student of zoology at the University of Leipzig, Germany. The University of Arizona conferred the degree of L. L. D. upon him in 1915.

From 1881 to 1889 the scientist was assistant in the Museum of Comparative Anatomy at Harvard. He was editor of the Journal of Ethnology and Archaeology 1890-94. For 23 years, 1895-1918, he was ethnologist in Washington of the Bureau of American Ethnology, becoming its chief in 1918.

Science News-Letter, February 18, 1928

One silk company in this country uses up 3,000,000 cocoons in a day.

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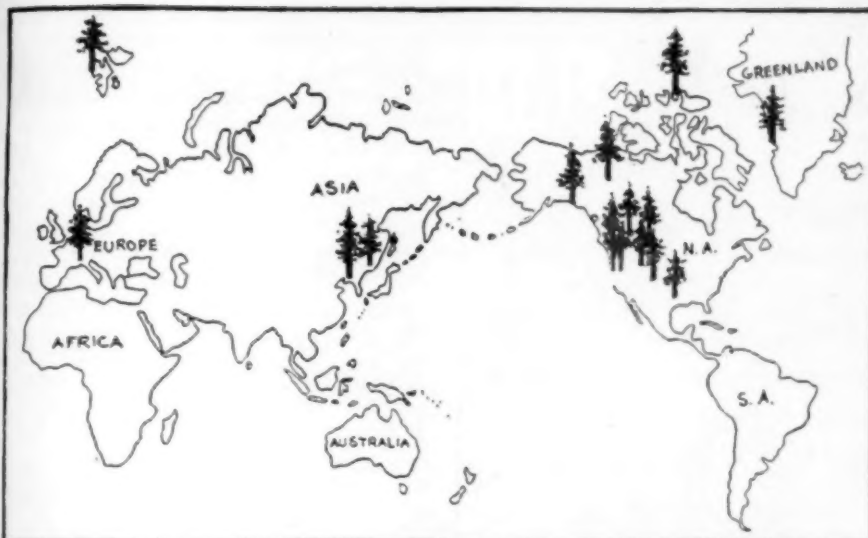
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THE TREES on this map mark the places where fossil remains of redwood have been found; they are stations on the long trek of the trees. Note especially the spots in the Arctic regions, where the tallest trees now are dwarf willows barely four inches high

### The March of the Redwoods

(Continued from page 98)

that when the Manchurian coal beds were being formed this ancient Asiatic land was at least a little more California-like than it is now.

As an interesting experiment, which will have to wait some years, perhaps even several centuries, for a complete answer, Dr. Chaney has planted near Peking and also in the Altai mountains a quantity of seeds of both the coast and the "big tree" species of the redwood. We may see the beginnings of the answer, our great-grandchildren will note further progress therein; no one knows how remote the human generation that will witness the death of these trees. As everyone knows, some of the "big trees" are older than Christendom.

More inwardly in Asia, in the same region where the dinosaur remains were found, Dr. Chaney has found other stone books with other botanical and climatological records. The lofty Khingan mountains, which separate Manchuria from Mongolia, drain the sea winds of their moisture, just as the high Sierras and Cascades drain the Pacific winds, making the great contrast between the moist coast lands and the arid inter-mountain plateau region. The contrast between present-day Manchuria and Mongolia is quite as marked, and the contrast during dinosaur days must have been even greater. For Dr. Chaney has been unable to find that the Gobi region has ever supported a rich forest of the Manchurian redwood type, or indeed any extensive forests at all.

During the Cretaceous period, which was the time of the dinosaurs, the

(Just turn the page)

### CHEMISTRY—AGRICULTURE

#### To Aid Cornstalk Use

Hungary, the country that unwittingly sent the corn borer to threaten the corn crop, America's greatest agricultural industry, is now making amends in the person of Dr. Bela Dorner, the chemist who has shown how to extract from cornstalks millions of dollars' worth of cellulose, the basic raw material for paper, rayon, lacquers and other products. Dr. Dorner is now in this country cooperating with the Cornstalk Products Company who are about to go into quantity production at their plant in Danville, Ill.

In a statement to Science Service, Dr. Dorner expressed his pleasure over the reception accorded him in America, and spoke in enthusiastic terms over the prospects for turning the millions of tons of hitherto wasted cornstalks into sources of income for farmers and factory operators.

"The industrial hunger for cellulose is world-wide," he said. "It is even more pronounced in Europe than in America, but industrialists everywhere recognize that with new uses for cellulose appearing daily, new and cheaper sources must be developed."

Although he worked out his process in Europe, Dr. Dorner was thinking mainly about America as the place where it will have its highest development.

"In Europe we do not regard cornstalks as the waste which you consider them in the great Corn Belt of the United States," he said. "Although Hungary is the fourth

country of the world in corn production, being in fact the Corn Belt of Europe, peasant farmers and small land owners use their stalks for fodder, and only on the large estates in some of the corn-growing provinces is there a surplus. In recent years the Hungarian government has compelled all stalks to be consumed or burned by April 1 to comply with corn-borer regulations.

"I am sorry to learn that this pest is spreading rapidly over the United States and that similar regulations must eventually be enforced probably in all corn-growing areas of your country. I am painfully aware that America traces this pest to an importation from Hungary; wherefore I am doubly proud of bringing to your agriculture and industry a Hungarian process for utilizing the cornstalks and making their destruction profitable. Cornstalk cellulose factories will be a boon to farmers wherever they are established.

"It is gratifying to learn that there is no unkindly feeling toward my country because we unintentionally sent you the corn-borer. We similarly recall in Hungary that the phylloxera pest which ravages our vineyards came from America, but we pray that you may not send us your Prohibition as the antidote!"

Dr. Dorner is one of the foremost industrial and agricultural chemists of Hungary. He has been connected continuously with the government service, in which he is completing his twenty-fifth year. The position he now occupies is equivalent to the directorship of the Bureau of Standards in this country, combined with that of chief of the Bureau of Chemistry in the Department of Agriculture.

Science News-Letter, February 18, 1928

### HYGIENE

#### Watercress Has Vitamines

The list of foods the doctor says you should eat has been augmented by a new one, watercress.

This familiar garnish for meat and salad is a remarkably rich source of the vitamin necessary for growth and of the scurvy-preventing vitamin C. Dr. Katherine H. Coward and P. Eggleton of the University of London have found. It boasts of small quantities of vitamin D as well.

The green shows considerable seasonal variation, however, in its growth promoting properties, being more effective in this respect in spring and summer than in winter.

Science News-Letter, February 18, 1928

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## The March of the Redwoods

(Continued from page 103)

dominant trees were Araucarias, modern forms of which are known in cultivation as Norfolk Island pine, monkey-puzzle tree, and by other names. They are now native only to lands in the southern hemisphere, especially South America. The living Araucaria species all prefer cool, rather dry habitats, and independent geological evidence connected with the dinosaurs indicates that the Mongolian species of these great lizards were dry-land, cool-climate animals. Thus we have two lines of evidence that the Gobi of two million years ago was more or less like the Gobi of today—not so dry perhaps, but certainly not a moist country, and subject to a rather cool climate.

Other fossils of a later date, the Tertiary, when the dinosaurs had vanished from the earth, show that the Gobi was still sticking to much the same kind of climate. At present there are no trees at all in the Gobi proper, but in the canyons of the Altai mountains, which extend out into it, there are numerous cottonwoods and shrubby junipers. These living trees, growing under conditions of low rainfall which make life possible for most trees, may be supposed to reflect the environment in Mongolia during the Tertiary, a suggestion which is amply supported by the associated fossil animals. These are almost entirely of plains types, including none of the forest animals which should be preserved in the rocks had there been widespread forests in Mongolia during that period.

Thus far have the pages of the great stone books of Manchuria and Mongolia been opened by the scientist. They still await further reading, and as soon as the revolutionary difficulties in China shall have run their course, scholarly adventurers will again be hard at their lessons, turning the pages over with pick and shovel.

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In the days of Hamurabi, 4,000 years ago, perfumery was considered so essential that even servants were ordered to use it.

The striped bass, which was carried from its home in the Atlantic to Pacific waters in 1879, is now the second most popular game fish in northern California.

Trees standing in Yellowstone National Park that turned to stone over 4,000,000 years ago were recently identified as sequoia, sycamore, and chestnut varieties.



# Classics of Science:

## The Mutation Theory

Although experiments in plant breeding take a considerable length of time, especially when the results desired are variations from the usual form of the plant, a plot of *Oenothera* would be an interesting addition to any garden, for its historical associations, for its scientific possibilities, and for its own sake.

**THE MUTATION THEORY,**  
*Experiments and Observations on the Origin of Species in the Vegetable Kingdom*, by Hugo de Vries (1903), translated by Prof. J. B. Farmer and A. D. Darbishire, Chicago, 1909.

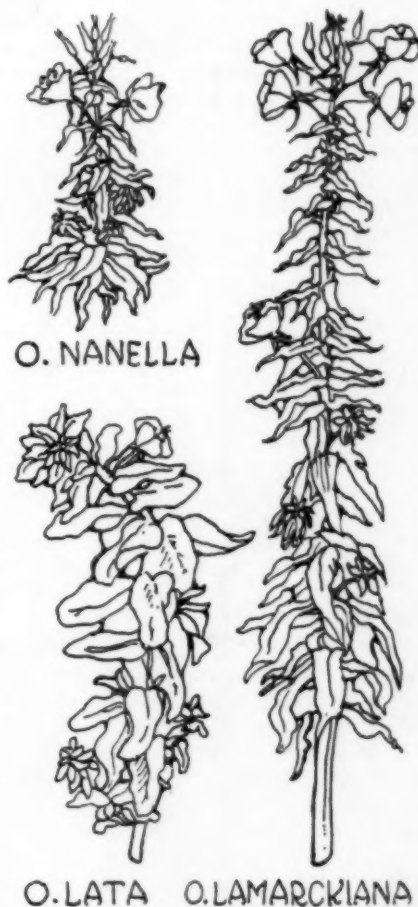
### A Mutating Plant

The chief obstacle in the way of getting material suitable for investigating the origin of species is our complete ignorance of the conditions under which this process takes place. In order to obtain this material I started in 1886, to search the country round Amsterdam for species, exhibiting such monstrosities or other peculiarities as I thought would suit my purpose. As a result of my quest I brought over one hundred species into cultivation, but only one of these turned out to be what I really wanted.

From this I conclude that most of the species in this locality are passing through a period of non-mutation, and that plants which happen to be actually passing through a mutable phase are encountered at any rate, relatively rarely.

The plant in question is *Oenothera Lamarckiana*, which together with its nearest allies *O. biennis* and *O. muricata* have been introduced into Europe from America. The species *Lamarckiana* differs from the others by its taller growth, by its much larger and more beautiful flowers, by the fact that self-fertilization rarely occurs, by its different leaves, and so forth. *O. Lamarckiana* was introduced from America into our gardens, from which it has subsequently escaped. At any rate this was the case in the locality in which I found it.

This was close to Hilversum and afforded peculiarly favorable circumstances for the most minute investigation. I visited the place during the summers of the years 1886-1888 almost every week, and, since that date at least once or twice nearly every year. The plant grew in a disused potato-field to which it had spread from a neighboring park. It began to spread in about the year 1875, and during the 10 years 1875-1885 it extended over about half the field. In



THE PARENT *OENOTHERA* and two of its mutants. Drawings made from de Vries' book

the succeeding years it multiplied still more rapidly; until the field was finally planted with forest trees. At the present day traces of the plant still exist.

A rapid multiplication of this kind during the course of a relatively short period of time has often been considered as one of the conditions for the appearance of a mutable period. This consideration led to a closer investigation on the spot, which confirmed the conclusion.

The plant exhibited a high degree of fluctuating variability in all its organs and characters. It presented also numerous variations of another kind, of which I shall only mention fasciation and "pitcher"-like malformation. Most of the plants were biennials, but many were annuals; and a few lived three years, as in the case of the beet.

(Just turn the page)

## "Radio" Aids Cancerous Mice

An attack on cancer is being made by high frequency electricity, close in wavelength to the short waves that have recently been found so effective in radio communication.

The researches conducted by the U. S. Public Health Service under the direction of Dr. J. W. Schereschewsky with his laboratory at the Harvard Medical School, have been in progress at intervals during the last five years and have now been informally reported to a congressional committee in connection with a request of an appropriation of \$5,000 to provide assistants and material for the work.

Experiments so far have been confined to mice and chickens. Much progress must be made before there can be any possibilities of applying the results to human beings. Mice with tumors artificially acquired in the laboratory were improved by being subjected to doses of oscillating electricity produced by vacuum tubes similar to those used in radio sets.

The frequencies used by Dr. Schereschewsky in his experiments ranged from 8,300 to 135,000 kilocycles per second, a range that expressed in the more familiar language of radio corresponds to wavelengths below about 40 meters. The most effective frequencies were found to be about the middle of the extremes used and more deaths of the mice occurred at the high and low ends of the frequency range. Some of the mice treated suffered a shriveling of the ears and tail due to the current to which they were subjected, but many were perfectly normal after the treatment that had a beneficial effect on their cancers.

The dosages of electricity used by Dr. Schereschewsky were much more than anyone could possibly receive from radio broadcasting and public health officials discounted in advance any ideas or suggestions that the speed of radio would by this means aid in the treatment of cancer. They also emphasized the fact that the method was still in its early experimental stage upon animals only, and that treatment of human being is still far in the future.

The investigations are being supported by the U. S. Public Health Service with laboratory space furnished by the Harvard Medical School. They are now being pushed on account of the promising results and the unique methods that have been developed.

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## The Mutation Theory

(Continued from page 105)

### New Species

That I really had hit upon a plant in a mutable period became evident from the discovery, which I made a year later, of two perfectly definite forms which were immediately recognizable as two new elementary species. One of them was a short-styled form: *O. brevistylis*, which at first seemed to be exclusively male, but later proved to have the power, at least in the case of several individuals, of developing small capsules with a few fertile seeds. The other was a smooth-leaved form with much prettier foliage than *O. Lamarckiana* and remarkable for the fact that some of its petals are smaller than those of the parent type, and lack the emarginate form which gives the petals of *Lamarckiana* their cordate character. I call this form *O. laevifolia*.

Both *O. brevistylis* and *O. laevifolia* come perfectly true from seed as will be shown later on. They differ from *O. Lamarckiana* in numerous characters, and are therefore to be considered as true elementary species.

When I first discovered them (1887) they were represented by very few individuals. Moreover each form occupied a particular spot on the field. *O. brevistylis* occurred quite close to the base from which the *Oenothera* had spread; *O. laevifolia* on the other hand, in a small group of 10 to 12 plants, some of which were flowering whilst others consisted only of the radical leaves, in a part of the field which had not up to that time been occupied by *O. Lamarckiana*. The impression produced was that all these plants had come from the seeds of a single mutant. Since that time, both the new forms have more or less spread over the field.

I could find neither of these forms in the herbaria of Leiden, Paris or Kew; nor have they, so far as I have been able to discover, been described from other localities. Whether or no they did arise in my locality can of course no longer be determined. But I think that until proof to the contrary is forthcoming this must be regarded as extremely probable. So much at any rate is certain that the discovery of these two species increased my hope of witnessing the origin of other species from the same stock—a hope which was soon to be fulfilled.

In the autumn of 1886 I brought two samples from Hilversum to Amsterdam for cultivation in the experimental garden. One lot consisted of nine particularly fine rosettes with

almost fleshy roots; the other, of the seed from a quinquelocular fruit from a plant growing in the middle of the field. Lastly, in the autumn of 1887 I collected the seeds of *O. laevifolia*. I obtained in this way three groups which, in conformity with the principle of nomenclature adopted by growers of beets, I call families; and these I continue to grow, separately, to the present day.

From these three families and their numerous lateral branches I have derived my whole culture, which has embraced several thousands of individuals almost every year. Latterly several hundreds of plants have been artificially fertilized for seed purposes every year.

Furthermore I have imported *O. brevistylis* direct from Hilversum, because it did not arise in my cultures. I have also occasionally made collections of seed in the field to afford material for control experiments.

In each of these three families new species have arisen in my garden; and they have been essentially the same in the three groups.

**Hugo de Vries** was born in Holland, February 16, 1848, and celebrated his 80th birthday this month at his home at Lunteren. His book, "The Mutation Theory," from which the above extract is taken, was published in 1903, and became one of the foundation-stones of the science of heredity. Mendel's fundamental paper was discovered by scientists about the same time. In the light of the investigations which followed the meaning of the term "mutation" has changed somewhat. More definite criteria of species are now available, and there is some doubt whether an entirely new species can arise by mutation. But *Oenothera Lamarckiana*, although probably not a pure strain in the beginning, remains a very interesting plant, and when de Vries retired in 1918 as Emeritus Professor of Botany of the University of Amsterdam he went to live at his country place where he could experiment further with his cultures of the "sporting evening primrose."

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### Do You Know That—

Explorers from the British Museum found two bronze water pumps buried on the site of an ancient Etruscan city.

A scientist has figured that once around the universe is 63,000 billion times the distance from the earth to the sun.

A wireless transmitter in Great Britain starts and stops the fog signals in the Firth of Clyde more than a mile away.

Pork should be thoroughly cooked, because poorly cooked pork may harbor parasites of a disease known as trichinosis.



## HYGIENE

**Healthiest Year on Record**

The healthiest year in history was 1927. Only 8.4 deaths for every 1,000 persons is the record for a group of insured wage-workers that numbers one-seventh of the total population of the United States and Canada.

If the death rate of 1926 prevailed, 8,808 persons among the insured group now living would have died, and if the rest of the population improved its health as much, some 50,000 lives were saved. If the death rate of sixteen years ago, 1911, had not been reduced 33 per cent. to the present figure, last year's death list would have numbered 72,570 more among the insured group.

These facts are shown by the statistics of the Metropolitan Life Insurance Company reporting the mortality of its industrial policyholders, which has been found to reflect the trends of the whole population.

The outstanding health fact of 1927 was the big drop in the tuberculosis mortality, the rate of 93.5 per 100,000 representing a decrease of 4.8 per cent. from the previous minimum of deaths from the great white plague. Recent surveys have shown that this reduction applies to all parts of the country, rural and urban, colored and white, and extends to all occupations and branches of industry.

Three of the diseases of childhood, measles, scarlet fever and whooping cough, had encouragingly low death rates, while influenza and pneumonia reached unexpected low records. Never, except in the years immediately following the big influenza epidemics of 1918 and 1919, has there been as big a drop in the number of deaths from these much dreaded plagues.

To counterbalance these gratifying returns, the toll of cancer was higher than ever before and that of diabetes remained the same as last year in spite of the increasing use of insulin. This, however, is no ground for drawing the conclusion that insulin is ineffective. Statisticians declare that the average age of diabetics at death has increased, and that without insulin the diabetes death rate would undoubtedly run even higher than it now is.

The automobile continued its guilty role in 1927 as principal cause of fatal accidents. Almost as many wage-earners' children lost their lives in 1927, it was pointed out, from

automobile accidents as from measles, scarlet fever and whooping cough combined, while the number of motor car fatalities as a whole was double that of ten years ago.

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## ASTRONOMY

**To Measure Sun's Distance**

A definite check on the distance of the earth from the sun is being made by University of California astronomers through observations of stars that will form a background for the planetoid Eros when it makes its remarkably close approach of 16,200,000 miles to the earth in 1931.

Many of the observations already have been completed by Dr. R. H. Tucker from the Lick Observatory on Mount Hamilton.

The positions of 821 stars were accurately determined in the series of observations thus far completed, according to Dr. Tucker. In the second series of observations, of 402 stars, about 2,100 checks were made during the course of 77 nights of work during the best observing season at Lick Observatory in 30 years.

The positions of the fixed stars, it is explained, appearing in the same portion of the sky as will the planetoid Eros during the coming approach, although at an infinitely greater distance away, will aid in the determination of the distance of Eros from the earth, both in terms of miles and in terms of a common astronomical unit, the mean diameter of the ellipse which the earth describes about the sun once each year.

By determining the exact distance of Eros in terms of both miles and of the unit of distance set by the earth's orbit about the sun, it will be possible also to compute the latter unit of distance in miles more accurately than ever before.

Eros' approach in 1931, astronomers state, will be its first close approach since its discovery in 1898. twenty miles in diameter, one of the host of such bodies known as the asteroids, but departing from the path followed by most of the group sufficiently to bring it in close proximity to the earth once in about 36 years.

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The increasing angle of the Leaning Tower of Pisa is found due to a spring of water under the tower, which has again become active and causes the soil to give way.

## RADIO

**Radio Photos Across U. S.**

Photographs will be sent across the continent by radio from Schenectady, N. Y., to Oakland, Calif., by May 1, with the same process that was used recently when pictures were broadcast from station WEAF in New York.

This is the prediction made here today by engineers of the General Electric Company who are now working to complete the preparations for the tests. At Oakland a special station is being erected which will operate on a power of ten kilowatts and with wave lengths of from ten to forty meters. This station will become a part of station KGO, which adjoins the General Electric factory at Oakland.

The process used in the WEAF tests, and the one which will be used in the transcontinental work, was developed by Dr. E. F. W. Alexanderson, of the General Electric research laboratory. The short wave transmitting station now in operation at South Schenectady, in conjunction with WGY, will be connected directly to the picture transmitter in Dr. Alexanderson's laboratory. One of Dr. Alexanderson's assistants is now on his way to Oakland with the receiving apparatus, which will be connected with the receiver at the new short wave station. Just as soon as this apparatus can be set up, tests will begin in transmitting photographs, and facsimiles of writing and printing, from New York to California. It is expected that this can be done before May first. After the picture transmission has been successfully operated, transcontinental experiments in television by radio are scheduled.

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## ASTRONOMY

**"Comet" Was Photo Defect**

The new "comet" that was announced recently as having been discovered by an astronomer named Filipoff in Algiers was not a comet at all, but a spurious image on a photographic plate. This announcement was made by Dr. Harlow Shapley, director of the Harvard College Observatory, which acts as the American clearing house for news of astronomical discoveries.

The original announcement of the supposed discovery was received from the international clearing house at Copenhagen, from which word has just been received of the mistake. As a result, the first comet discovery of 1928 is yet to be made.

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## SEISMOLOGY

**Locate Mexican Earthquake**

The earthquake that shook Mexico City on Friday morning, February 10, was centered at Puebla, south-east of the capital, according to an announcement of the U. S. Coast and Geodetic Survey here after study of reports gathered from seismograph observatories by Science Service. The quake occurred at 9 hours 38 minutes and 36 seconds eastern standard time, and the epicenter, or point of greatest motion, was at latitude  $18.5^{\circ}$  north and longitude  $97.5^{\circ}$  west. This vicinity is one of the seismic regions of the globe, where heavy quakes are likely to occur.

This determination was made from reports to Science Service from seismograph stations at the Dominion Observatory, Ottawa, Canada; the Meteorological Observatory, Victoria, B. C.; the U. S. Weather Bureau, Chicago, Ill., and the stations of the Survey at Tucson, Ariz., and of the Jesuit Seismological Association at Loyola University, New Orleans, La.

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## EUGENICS

**35 Sons, No Daughters**

A family in which the male tendency is so strong that for four generations not a daughter has been born has been discovered in San Pedro, Calif., through records reported to the Eugenics Records Office at Cold Spring Harbor.

No daughters have been born in the four generations although there have been thirty-five sons. The founder of the American branch of this family was born in Germany, the youngest of nineteen boys. He, in turn, had twelve sons. Out of these, one married an English Canadian woman. They had one son, who married and had three sons.

Chance as the sole explanation of this continued production of male children only is considered to be highly improbable. One hypothesis advanced is that the female embryos are early destroyed by some hereditary lethal factor carried by the family from generation to generation. Dr. C. B. Davenport, director of the Eugenics Records Office, is making a study of such one-sex families in an effort to determine their cause and he would welcome reports of other such families.

Male families would, of course, immediately die out if normal families did not exist for furnishing wives to the male strain.

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## ELECTRICAL ENGINEERING

**Can Lend Electric Power**

Interconnection of the electric power systems of great areas of the country is proceeding rapidly with consequent economy and greater reliability of service, it was revealed at the meeting of the American Institute of Electrical Engineers.

Power can be sent over high voltage lines for thousands of miles, supplying the emergency needs of other cities and states. Hydroelectric plants when the rivers are running full can send their excess power to other localities and in the dry season can call upon the other companies to aid them fill local needs. Little power plants are giving way to larger units which can make more kilowatts for less dollars. Small hydroelectric plants, often automatically operated with only a caretaker or two constantly on the job, can be plugged into the great power system and economically do their share in turning the wheels of industry.

In spite of the progress reported at the symposium in which a dozen engineers spoke, W. E. Mitchell of Birmingham declared that electrical engineers still had much to accomplish before the problems of supplying electricity to all most reliably and economically are solved. The dispatching of power and the sending of it over various systems owned and operated by different companies has many mechanical and organizational difficulties.

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## PEDAGOGY

**Ground Glass "Blackboard"**

Blackboards of translucent ground glass lighted from behind are proposed as a substitute for the opaque black surface familiar to every school child. Prof. W. Weniger of Oregon Agricultural College has demonstrated this new blackboard and is using it teaching his physics classes.

The old type of blackboard is difficult to illuminate so that all the room can see, Prof. Weniger found, while the ground glass lighted from the rear electrically allows everything chalked upon it to be seen from all parts of the room even when a combination of daylight and artificial illumination is being used. Erasing on the new "blackboard" is easy. It can also be used as a stereopticon screen and chalk talks can be interspersed with lantern slides without changing the lighting of the room.

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**NATURE RAMBLINGS**

By FRANK THONE

**Ladybird Beetle**

"Ladybird, ladybird, fly away home—  
Your house is afire, your children alone!"

Mendacious as news and atrociously bad rhyme as poetry, this ritual verse of our childhood is of interest in that it inculcates the right relation between human beings and the little spotted beetles that are even now coming out of their winter quarters and appearing in our houses on warm, bright days.

For ladybird beetles are friends of man, among the best friends he has in the whole swarming insect world. Not that they have any particular intention of being so. They probably do not even know of the existence of our race, for like most beetles they are so shortsighted that they do not see beyond the first few millimeters of skin when we hold them in our hands. But their tastes in food run to exactly those pests of garden and orchard shrubs and trees that do us harm—scale insects, aphids, and their other evil kin. Ladybird beetles are not named according to their nature, for they are among the most ferociously carnivorous of all the lesser creatures in the world. By rights they should be called leopard beetles or some such name.

For a long time they were left to work for man without any help from him. Then the orange growers, driven nearly desperate by the scourge of scale insects, learned how to concentrate armies of the beetles in their orchards just when they were waking from their winter sleep, empty and demanding food. Now it has become a regular industry in California for men to go up into the Sierras, gather tons of pine needles containing the sleeping beetles, and sift them out for transportation to the lowlands. They are held in the artificial winter of cold storage plants until their help is needed in clearing up the groves, when they are thawed out and released.

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HQ	Family. Marriage. Woman.
HV	Social pathology.
L	Education.
M	Music.
N	Fine arts.
P	Philology and linguistics.
Q	Science. General.
QA	Mathematics.
QB	Astronomy.
QC	Physics.
QD	Chemistry.
QE	Geology.
QH	Natural history.
QK	Botany.
QL	Zoology.
QM	Human anatomy.
QP	Physiology.
QR	Bacteriology.
R	Medicine. General.
S	Agriculture. General.

SB	Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD	Forestry.
SF	Animal culture. Veterinary medicine.
SH	Fish culture and fisheries.
SK	Hunting. Game protection.
T	Technology. General.
TA	Engineering. General.
TC	Hydraulic engineering.
TD	Sanitary and municipal engineering.
TE	Roads and pavements.
TF	Railroads.
TG	Bridges and roofs.
TH	Building construction.
TJ	Mechanical engineering.
TK	Electrical engineering and industries.
TL	Motor vehicles. Cycles. Aeronautics.
TN	Mineral industries. Mining and Metallurgy.
TP	Chemical technology.
TR	Photography.
TS	Manufactures.
TT	Trades.
TX	Domestic science.
U	Military science. General.
V	Naval science. General.

## Dewey Classification

The main divisions of the Dewey Decimal Classification, used in many libraries and by many individuals, is given below for the convenience of those who wish to use this system:

000	GENERAL WORKS—
010	Bibliography
020	Library economy
030	General cyclopedias
040	General collected essays
050	General periodicals
060	General societies
070	Newspapers
080	Special libraries. Polygraphy
090	Book rarities
100	PHILOSOPHY—
110	Metaphysics
120	Special metaphysical topics
130	Mind and body
140	Philosophical systems
150	Mental faculties. Psychology
160	Logic
170	Ethics
180	Ancient philosophers
190	Modern philosophers
200	RELIGION—
210	Natural theology
220	Bible
230	Doctrinal. Dogmatics. Theology
240	Devotional. Practical
250	Homiletic. Pastoral. Parochial
260	Church. Institutions. Work
270	Religious history
280	Christian churches and sects
290	Ethnic. Non-Christian
300	SOCIOLOGY—
310	Statistics
320	Political science
330	Political economy
340	Law
350	Administration
360	Associations. Institutions
370	Education
380	Commerce. Communication
390	Customs. Costumes. Folklore
400	PHIOLOGY—
410	Comparative
420	English
430	German
440	French

450	Italian
460	Spanish
470	Latin
480	Greek
490	Minor Languages
500	NATURAL SCIENCE—
510	Mathematics
520	Astronomy
530	Physics
540	Chemistry
550	Geology
560	Paleontology
570	Biology
580	Botany
590	Zoology
600	USEFUL ARTS—
610	Medicine
620	Engineering
630	Agriculture
640	Domestic economy
650	Communication. Commerce
660	Chemical technology
670	Manufactures
680	Mechanic trades
690	Building
700	FINE ARTS—
710	Landscape gardening
720	Architecture
730	Sculpture
740	Drawing. Decoration. Design
750	Painting
760	Engraving
770	Photography
780	Music
790	Amusement
800	LITERATURE—
810	American
820	English
830	German
840	French
850	Italian
860	Spanish
870	Latin
880	Greek
890	Minor languages
900	HISTORY—
910	Geography and travels
920	Biography
930	Ancient history
	Modern
940	Europe
950	Asia
960	Africa
970	North America
980	South America
990	Oceania and polar regions

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## First Glances at New Books

**INVESTIGATIONS ON CHLOROPHYLL: METHODS AND RESULTS**—Richard Willstätter and Arthur Stoll—Translated by Frank Milton Schertz and Albert R. Merz—*F. M. Schertz, Washington*. (\$4.50). The importance of the work of Willstätter and Stoll on chlorophyll needs no elaboration, especially for plant physiologists and for botanists and chemists in general. Willstätter is a great name even to those unfortunates of the present generation of younger scientists who have been denied an adequate knowledge of German by the curriculum-disrupting hysteria attending the late war. For these, and for all who find their native tongue easier to read than technical German, the translators have performed a service of the very highest order in producing an English version at once accurate and faithful to the original, and readable and idiomatic in its style. The senior translator has performed a further service in himself undertaking the publication and marketing of "a good book and an important one, but too specialized to be a paying proposition."

Science News-Letter, February 18, 1928

**PHILOSOPHY**—Bertrand Russell—*Norton* (\$3). An attempt to synthesize modern knowledge by one of the most brilliant thinkers of our time. The only book so far in existence which combines in a single viewpoint such recent theories as emergent evolution, *Gestalt* psychology, behaviorism, and the new conceptions of matter introduced by Einstein, Bohr, Schrödinger and Heisenberg.

Science News-Letter, February 18, 1928

**CHEMILUMINESCENCE** — *National Research Council* (\$1). The report of a subcommittee of the National Research Council, under the chairmanship of Prof. E. Newton Harvey. The various phases of the subject are discussed, including the very interesting and important one of the luminescence of various animals.

Science News-Letter, February 18, 1928

**CINCINNATI RESOURCE SURVEY**—*University of Cincinnati Institute of Scientific Research*. How scientists and business men can get together to assay the industrial possibilities of a great city is shown in these two small summary pamphlets that point the scientific way for the development of many major Cincinnati activities.

Science News-Letter, February 13, 1928

## Important American Books of 1926

Each year the International Institute of Intellectual Cooperation of the League of Nations prepares a World List of Notable Books, including about 600 titles. Forty of these are allotted to the United States, and the selection is made by the American Library Association with the cooperation of specialists. The list of American titles for the year 1926 has just been announced by the Association. Two of them are by foreign authors who live, write and publish in the United States.

Sixteen of the titles pertain to science, while five more are listed under social science.

The complete list follows:

### HISTORY

**NEW ENGLAND IN THE REPUBLIC, 1776-1850**—James Truslay Adams—*Little*.  
**THE ADVANCING SOUTH**—Edwin Mims—*Doubleday*.  
**THE CONQUEST OF BRAZIL**—Roy Nash—*Harcourt*.  
**ACOMA, THE SKY CITY**—Mary Katrine Sedgwick—*Harvard University Press*.  
**OUR TIMES, v. I, THE TURN OF THE CENTURY, 1900-1904**—Mark Sullivan—*Scribner*.  
**FIX BAYONETS!**—John W. Thomason—*Scribner*.

### SOCIAL SCIENCE

**ESSAYS ON NATIONALISM**—Carlton J. H. Hayes—*Macmillan*.  
**THE UNITED STATES OIL POLICY**—John Ise—*Yale University Press*.  
**THE MEANING OF A LIBERAL EDUCATION**—Everett Dean Martin—*W. W. Norton & Co.*  
**IMPERIALISM AND WORLD POLITICS**—Parker T. Moon—*Macmillan*.  
**FOLK BELIEFS OF THE SOUTHERN NEGRO**—Niles N. Puckett—*University of North Carolina Press*.

### RELIGION

**THIS BELIEVING WORLD**—Lewis Browne—*Macmillan*.  
**THE FACE OF SILENCE**—Dhan Gopal Mukherji—*E. P. Dutton*.  
**RELIGION IN THE MAKING**—A. N. Whitehead—*Macmillan*.

### PHILOSOPHY AND PSYCHOLOGY

**THE NEW UNIVERSE**—Baker Brownell—*D. Van Nostrand Co.*  
**THE HISTORY OF PHILOSOPHY**—William T. Durant—*Simon and Schuster*.  
**RICHARD KANE LOOKS AT LIFE**—Irwin Edman—*Houghton*.  
**THE MAKING OF THE MODERN MIND**—John Herman Randall—*Houghton*.  
**GENETIC STUDIES OF GENIUS; v. I. MENTAL AND PHYSICAL TRAITS OF A THOUSAND GIFTED CHILDREN**—Lewis M. Terman and others—*Stanford University Press*.

### DRAMA

**THREE AMERICAN PLAYS**—Maxwell Anderson and Lawrence Stallings—*Harcourt*.  
**THE LONESOME ROAD: SIX PLAYS FOR THE NEGRO THEATRE**—Paul Green—*Robert M. McBride*.  
**THE GREAT GOD BROWN**—Eugene O'Neill—*Boni and Liveright*.

### BIOGRAPHY

**ISRAEL: THE LIFE AND TIMES OF EDGAR ALLAN POE**—Hervey Allen—*George H. Doran Co.*  
**DEAN BRIGGS**—Rollo W. Brown—*Harper*.  
**THE INTIMATE PAPERS OF COLONEL HOUSE**—Edward M. House, edited by Charles Seymour—*Houghton*.  
**EDGAR ALLAN POE: A STUDY IN GENIUS**—Joseph Wood Krutch—*Alfred A. Knopf*.  
**JEFFERSON**—Joseph Jay Nock—*Harcourt*.  
**ABRAHAM LINCOLN, THE PRAIRIE YEARS**—Carl Sandburg—*Harcourt*.  
**TURGENEV, THE MAN, HIS ART, AND HIS AGE**—Avraham Yarmolinsky—*Century*.

### SCIENCE, NATURAL AND APPLIED

**ON THE TRAIL OF ANCIENT MAN**—Roy Chapman Andrews—*G. P. Putnam's Sons*.  
**THE ARCTURUS ADVENTURE**—William Beebe—*G. P. Putnam's Sons*.  
**A BIPOLAR THEORY OF LIVING PROGRESS**—George W. Crile—*Macmillan*.  
**NATURALISTS GUIDE TO THE AMERICAS**—Ecological Society of America—*Williams & Wilkins*.  
**BRAINS OF RATS AND MEN**—Charles J. Herrick—*University of Chicago Press*.  
**THE THEORY OF THE GENE**—Thomas H. Morgan—*Yale University Press*.  
**THE NATURE OF THE WORLD AND OF MAN**—Horatio Hackett Newman, ed.—*University of Chicago Press*.  
**PHOTOSYNTHESIS**—Herman A. Spöhr—*Chemical Catalog Co.*

### BELLES LETTRES AND ART

**PRIMITIVE NEGRO SCULPTURE**—Paul Guillaume and Thomas Munro—*Harcourt*.  
**THE GOLDEN DAY**—Lewis Mumford—*Boni and Liveright*.  
**CRITICAL WOODCUTS**—Stuart P. Sherman—*Scribner*.

Science News-Letter, February 18, 1928

### ARCHAEOLOGY

#### Magic Inspired Art

Prehistoric Americans, like the cave men of Europe, carved and painted pictures of animals and men to help them in working magic.

Thus may be explained many of the mysterious, gaily painted animals and crudely carved symbols found on the rocks where Indians once lived, according to Julian H. Steward, anthropologist, of the University of California. Mr. Steward is making the first comprehensive study of the ancient puzzle pictures on western rocks.

Mountain sheep and other animals recognized in these prehistoric American art exhibits were most likely painted in connection with rites designed to make the herds of game animals increase, thus insuring food for the people, Mr. Steward points out. Some of the moon faced, angular human beings scratched on the rocks are dancers in the ceremonial rites, and others appear to be deities.

Some of the designs were painted in conspicuous places on the rocks as clan symbols such as are used by modern Pueblo Indians. And other pictures marked sites of water holes and other important spots, it is believed.

In Nevada and eastern California, an extremely puzzling type of picture is found, consisting of angular designs, many of them elaborately drawn. These are very ancient, judging from the fact that they are sometimes found deeply buried beneath old mineral deposits.

The wide variety of designs on the rocks is clear proof that the Indians had no alphabet system, Mr. Steward concludes.

Science News-Letter, February 18, 1928

## A Statement of Purpose

(The aims, ideals and aspirations of an institution)

**S**CIENCE SERVICE is a unique institution, established at Washington for the purpose of disseminating scientific information to the public. It aims to act as a sort of liaison agency between scientific circles and the world at large. It interprets original research and reports the meetings of learned societies in a way to enlighten the layman. The specialist is likewise a layman in every science except his own and he, too, needs to have new things explained to him in non-technical language. Scientific progress is so rapid and revolutionary nowadays that no one can keep up with it from what he learned at school. Science Service endeavors to provide life-continuation courses in all the sciences for newspaper readers anywhere in America without tuition fees or entrance examinations.

In a democracy like ours it is particularly important that the people as a whole should so far as possible understand the aims and achievements of modern science, not only because of the value of such knowledge to themselves but because research directly or indirectly depends upon popular appreciation of its methods. In fact the success of democratic institutions, as well as the prosperity of the individual, may be said to depend upon the ability of people to distinguish between science and fakes, between the genuine expert and the pretender.

Science Service spares no pains or expense in the endeavor (1) to get the best possible quality of popular science writing and (2) to get it to the largest possible number of readers. If in doing this it can make both ends meet, so much the better. If not, it will do it anyway.

Through the generosity of E. W. Scripps, Science Service has been assured of such financial support as to insure its independence and permanence. Mr. Scripps's long and wide experience as a newspaper editor and proprietor had convinced him of the importance of scientific research as the foundation of the prosperity of the nation and as guide to sound thinking and living and he realized the need for an independent agency that would bring the results of research to the attention of the entire people so these could be applied to the solution of their personal, social or political problems.

Science Service is chartered as a non-profit-making institution and all receipts from articles, books, lectures and films are devoted to opening up new avenues for the diffusion of knowledge and developing promising methods of popular education. Although Science Service has a philanthropic purpose, it is conducted on business principles, with the aim of making each branch of its activities ultimately self-supporting so far as possible. All acceptable contributions are paid for and all published articles are charged for.

Science Service is under the control of a Board of Trustees composed of ten scientists and five journalists. The leading national organizations of all the sciences, the National Academy of Sciences, the National Research Council, and the American Association for the Advancement of Science, appoint three trustees each.

Science Service occupies offices in the magnificent new building of the National Academy of Sciences and the National Research Council on Potomac Park opposite the Lincoln Memorial.

This strategic situation enables the Service to keep constantly in touch with the progress of the sciences because new inventions and discoveries are promptly put on exhibition in the building, and the Council brings together investigators in the various sciences and leaders in engineering and industry from all parts of the country.

Science Service is not a governmental institution, but it is in close contact with the numerous governmental bureaus of research. It is not under the control of any clique, class or commercial interest. It is not the organ of any single scientific association. It serves all the sciences. It engages in no propaganda, unless it be called propaganda to urge the value of research and the usefulness of science.

Science Service began its work on January 1, 1921, and has now a sizable office staff with a large corps of contributors in the chief research institutions of this country and Europe.